

Ch15: Ground Water

March 8, 2016 9:57 AM

water table - a line at the top of the zone of saturation where the saturated zone is not confined by overlying impermeable rocks [Fig 15.4]

Zone of saturation - (phreatic zone) - immediately above an impermeable rock or soil layer where water fills all accessible pore space (below water table line)

Zone of aeration - (vadose zone) - zone above the zone of saturation where pore spaces are partly filled with water, partly with air (above water table line)

aquifers - a rock that holds and transmits enough water to be useful as a source of water
ex sandstone or any porous & permeable rock

porosity - proportion of holes or cracks unfilled by solid material (room for water, oil...)
(# of holes)

permeability - a measure of how readily fluids pass through the material
- how interconnected are the pores?

impermeable - water can't flow through

- aquitard or aquiclude are basically impermeable rocks so not useful for allowing H_2O to flow through ex shale
- the smaller the particle the greater the porosity (but the less the permeability)
- consider shape and sorting too
 - if perfect spheres + well sorted then have same amount of porosity no matter the size

unconfined aquifer - overlain by permeable rocks so water is not under pressure, water must be pumped out of well
[Fig 15.4]

confined aquifer - sandwiched between impermeable layers, can be under pressure

artesian water is same H_2O , just under pressure

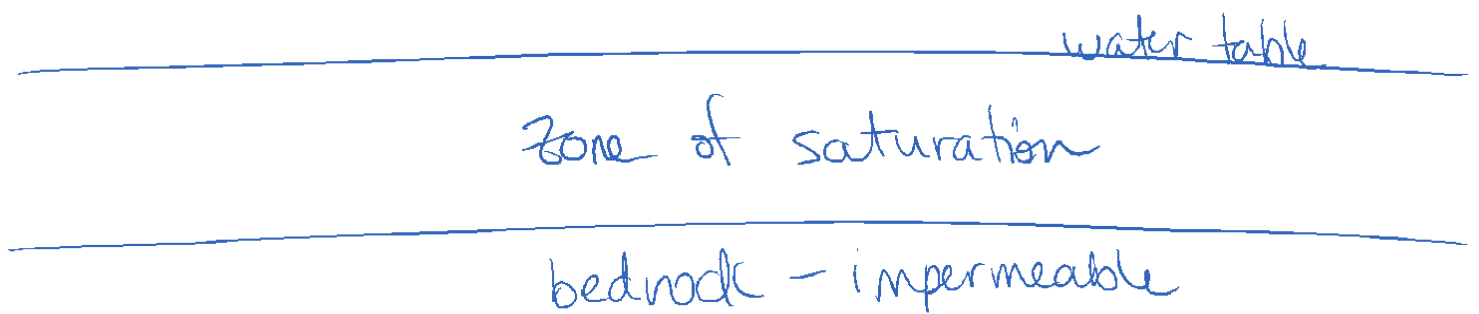
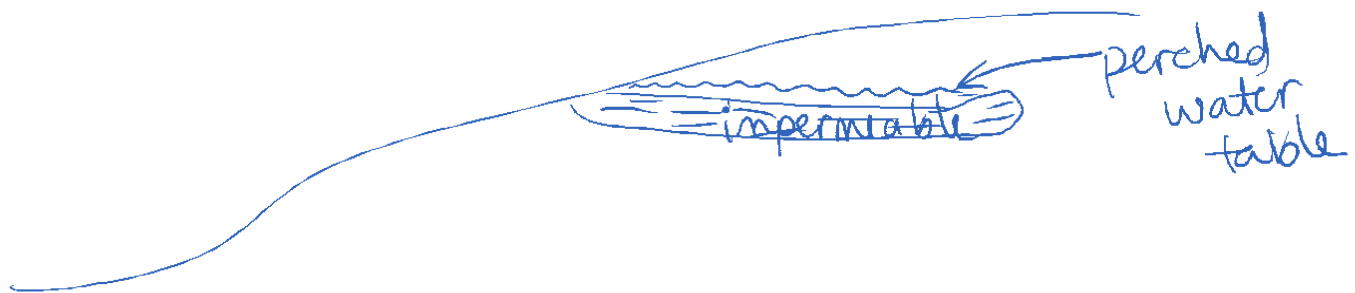
⇒ artesian well - water spurts out up to its potentiometric level
[Fig 15.5]

perched water table - patch of impermeable material produces a mini water table

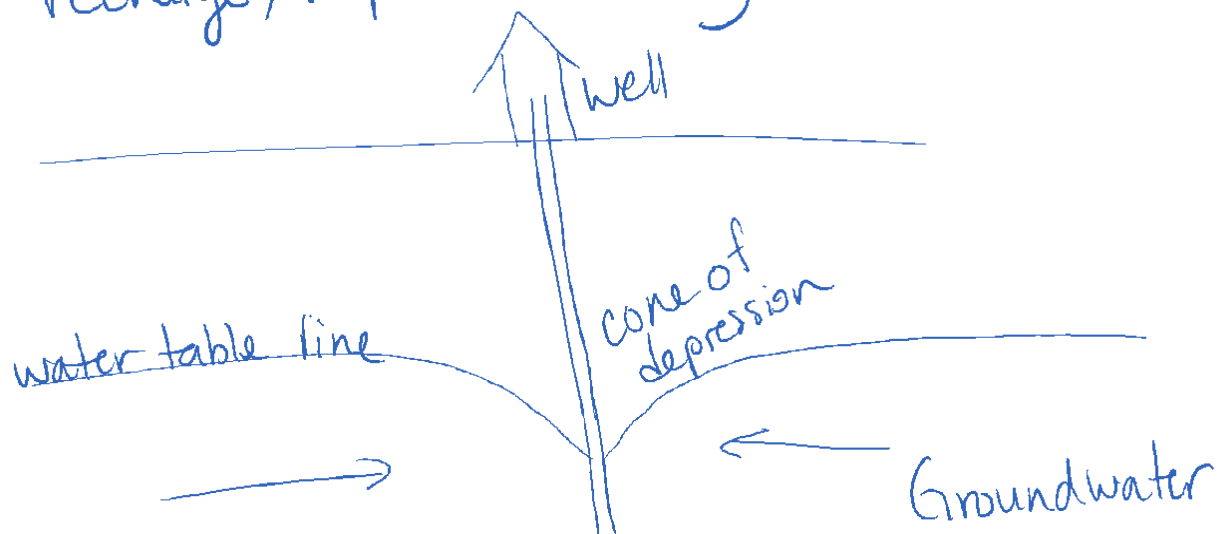
much higher than the true regional
water table

- problems: can run out easier
be polluted easier

[Fig 15.6]



Shape of the water table line varies on:
- if being pumped out faster than can
recharge/replenish [Fig 15.11]



bedrock

more permeable = smaller cone

— varying surface topography



— the location of permeable rocks

— depth varies by season and use
(drill well below lowest water table level)

Green pg 16-17

White pg 14-18